

**What is Claimed is:**

1. An ultrasound probe, comprising:

a support member;

a signal cable comprising a plurality of electrically conductive members extending  
5 along the length thereof, wherein a distal end portion of each of said plurality of electrically conductive members is separately at least partially embedded within and extends through said support member to a first side thereof; and,

an ultrasound transducer array supportably mounted to said first side of said support member, said ultrasound transducer array including a plurality of transducer  
10 elements electrically and fixedly interconnected to different ones of said plurality of electrically conductive members at said first side of the support member.

2. An ultrasound probe as recited in Claim 1, wherein each of said electrically conductive members enter the support member on a second side thereof that opposes  
15 the first side.

3. An ultrasound probe as recited in Claim 2, wherein said electrically conductive members follow substantially parallel paths through said support member.

4. An ultrasound probe as recited in Claim 2, wherein said support member includes a plurality of openings, extending therethrough from said second side to said first side thereof, for separately receiving different ones of said plurality of electrically conductive members in one-to-one relation.

5. An ultrasound probe as recited in Claim 4, wherein said support member comprises:

first and second members interconnected on adjoining sides thereof with said plurality of electrically conductive members captured therebetween.

6. An ultrasound probe as recited in Claim 5, wherein said plurality of openings are defined by channels on at least one said adjoining sides of said first and second members.

5 7. An ultrasound probe as recited in Claim 1, wherein said support member comprises an acoustic dampening material.

8. An ultrasound probe as recited in Claim 7, wherein said acoustic dampening material has an acoustic dampening index of at least about 1 dB/cm MHz.

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9. An ultrasound probe as recited in Claim 7, wherein said acoustic dampening material substantially surrounds the distal end portions of said plurality of electrically conductive members.

15 10. An ultrasound probe as recited in Claim 7, wherein said support member comprises:

adjoined first and second portions comprising different first and second acoustic dampening materials, respectively.

20 11. An ultrasound probe as recited in Claim 1, wherein said first side of said support member includes a plurality of separated portions, and wherein different ones of said plurality of electrically conductive members extend through different ones of said plurality of separated portions.

25 12. An ultrasound probe as recited in Claim 11, wherein said plurality of transducer elements are supportably interconnected to different ones of said plurality of separated portions of said support member.

30 13. An ultrasound probe as recited in Claim 12, wherein said plurality of transducer elements are defined by separated portions of a piezoelectric material.

14. An ultrasound probe as recited in Claim 13, wherein said plurality of transducer elements are further defined by separated portions of at least one electrically conductive signal layer interconnected between a first side of said piezoelectric layer and corresponding ones of said plurality of separated portions of said support member.

15. An ultrasound probe as recited in Claim 13, wherein said plurality of transducer elements are further defined by an electrically conductive ground member interconnected to a second side of said piezoelectric layer in opposing relation to said first side of said support member.

16. An ultrasound probe as recited in Claim 15, wherein said first electrically conductive ground member is electrically connected to a conductive ground member of said signal cable.

17. An ultrasound probe as recited in Claim 15, further comprising:  
an acoustic impedance matching layer interconnected to said ground member.

18. An ultrasound probe as recited in Claim 1, wherein a primary portion of each of said plurality of electrically conductive members extends proximally from said support member, and wherein said primary portions of said plurality of electrically conductive members comprise at least a majority of the lengths of said plurality of electrically conductive members from a distal end to a proximal end of said signal cable.

19. An ultrasound probe as recited in Claim 18, further comprising:  
a coupler, fixedly disposed at said proximal end of said signal cable, for selective interconnection and disconnection of said ultrasound probe to an ultrasound imaging system.

20. An ultrasound probe as recited in Claim 18, wherein said signal cable further comprises:

an electrically non-conductive and flexible carrier, wherein said plurality of electrically conductive members are separately interconnected in coincidental orientations to said carrier.

21. An ultrasound probe as recited in Claim 20, wherein said signal cable further comprises:

an electrically conductive member interconnected to said carrier layer.

22. An ultrasound probe, comprising:

a support member comprising an acoustic dampening material having an acoustic dampening index of at least about 1db/cm MHz;

a signal cable comprising a plurality of electrically conductive wires extending along the length thereof, wherein a distal end portion of each of said plurality of electrically conductive wires is separately at least partially embedded within and extends through said support member from a first side to a second side thereof, and wherein the proximal end of each of said electrically conductive wires is fixedly interconnected to a coupler; and

an ultrasound transducer array is supportably mounted to the first side of the support member, said ultrasound transducer array including a plurality of transducer elements electrically and fixedly interconnected to different ones of said plurality of electrically conductive wires.

23. An ultrasound probe as recited in Claim 22, wherein said plurality of electrically conductive wires follow substantially parallel paths through said support member.

24. An ultrasound probe as recited in Claim 23, wherein said support member includes a plurality of openings, extending from said second side to said first side

thereof, for conformally and separately receiving different ones of said plurality of electrically conductive wires in one-to-one relation.

25. An ultrasound probe as recited in Claim 22, wherein said support member  
5 comprises:

first and second members interconnected on adjoining sides thereof with said plurality of electrically conductive wires captured therebetween.

26. An ultrasound probe as recited in Claim 22, where said support member  
10 substantially surrounds the distal end portions of said plurality of electrically conductive wires.

27. An ultrasound probe as recited in Claim 22, further comprising:  
a plurality of signal cables each comprising a plurality of electrically conductive  
15 wires extending along the length thereof, wherein a distal end portion of each of said plurality of electrically conductive wires comprising each of said plurality of signal cables is separately and at least partially embedded within and extends through said support member from said second side to said first side thereof, and wherein said ultrasound transducer array includes a further plurality of transducer elements electrically and  
20 fixedly interconnected to different ones of said plurality of electrically conductive wires of said plurality of signal cables at said first side of the support member.

28. An ultrasound probe as recited in Claim 27, wherein said support member  
comprises:  
25 first and second members interconnected on adjoining sides thereof with said plurality of electrically conductive wires of each of said plurality of signal cables captured therebetween.

29. An ultrasound probe as recited in Claim 27, wherein said support member  
30 comprises:

a plurality of support members interconnected in a stacked manner, wherein said plurality of electrically conductive wires of different ones of said plurality of signal cables are captured between different adjacent pairs of said plurality of support members.

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